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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2002951187 for a patent by OWEN KEITH HUTCHISON as filed on 04 September 2002.

I further certify that the above application is now proceeding in the name of INNOVATIVE MOTORCYCLE TECHNOLOGY PTY. LTD pursuant to the provisions of Section 113 of the Patents Act 1990.



WITNESS my hand this  
Eleventh day of August 2003

*J. Billingsley*

JULIE BILLINGSLEY  
TEAM LEADER EXAMINATION  
SUPPORT AND SALES

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**Australia  
Patents Act 1990**

**Provisional Specification  
Provision Patent**

# **Combined Clutch and Brake Actuator With Hydraulic Bias Valve**

**The invention is described in the following statement:**

## **Combined Clutch and Brake Actuator with Hydraulic Bias Valve**

### **Description**

A hydraulic system to facilitate the combining of the clutch and brake functions on a motorised vehicle to a single control.

This invention came about as a result of difficulties I had in operating the controls of a motorised vehicle due to an injury I sustained to my leg. By combining the two functions I found the vehicle to be much easier to control.

The following invention is based on the principle that the appendage that operates the control should always be on, or in close proximity to that control; i.e. on a motorcycle your hands are always on the handlebars but your feet may not be on the footpegs, therefore a foot operated brake is not as safe. In a motorised vehicle, such as a motorcar, your feet should not have to swap from one pedal to another pedal.

To assist in the understanding of the invention, reference will now be made to the accompanying drawings.

Figure -1-

1. Fluid Reservoir
2. Master Cylinder Actuator
3. Master Cylinder
4. Brake only Function Adjustor
5. Bias Spool Valve
6. Hydraulic Line to Brake
7. Spring Tension Adjustor for Bias
8. Bias Valve Actuator
9. Bias Valve Piston Stop Adjustor
10. Clutch Slave Cylinder
11. Clutch Slave Cylinder Piston Stop Adjustor

### **Bias Valve Operation**

When the Master Cylinder 3. is activated by the Master Cylinder Actuator 2. the hydraulic pressure generated first operates the Clutch Slave Cylinder Stop 11. When this happens the rise in pressure moves the Bias Valve Piston towards the right, acting against the spring controlled by the Spring Tension Adjustor for Bias 7. Note, that this Adjustor 7. can be set so that the Bias Piston moves to the right before the Clutch Piston contacts Stop 11., thus enabling an overlap of the Clutch and Brake functions.

As the Bias Piston moves from left to right it allows the following functions to happen:

1. Operate Clutch
2. Shut Brake Return Valve
3. Operate Brake
4. Close Clutch Port
5. Open Clutch Return Port

Operating the Bias Valve Actuator 8. has the effect of bias towards the brake function. If the Bias Valve Actuator 8. is operated to the limit of its travel to the right, controlled by Bias Valve Piston Stop Adjustor 9. then only the brakes are operated. Note; the Brake only Function Adjustor 4. overrides the spring to achieve positive activation of the Bias Valve piston.

Figure 2 and 3 show a two lever, single plane system of operation suitable for use with handlebar mounted controls. Lever A operates the Master Cylinder and Lever B operates the Bias Valve. For safety reasons Adjuster 4 and 3 enables one finger to operate the brake, by virtue of the fact that if either lever is moved enough it will operate the brake. It is envisaged for safety reasons, that on a motorcycle this would be the rear brake, however it could operate a linked front and rear brake or even the front brake if desired.

Note; Figure 2 is looking at the clutch/brake control from in front of the vehicle.

Figure 3 is looking down at the clutch/brake control sitting on the vehicle.

Figure 4 shows another possible system of operation suitable for handlebar operation.

Note this is similar in operation to the previous system with the exception of the addition of a Pivoted Slide Bar joining the two Levers. This allows one finger operation of all functions.

Also note the relative positions of the Master Cylinder and the Bias Valve is reversed.

Figure 5 shows another possible method of operation suitable for handlebar operated controls. The Master Cylinder being operated by pulling the Lever towards the handlebar, i.e in direction A and the Bias Valve being operated by downward movement of the Lever i.e in direction B. This mechanical operation is possible by the use of a Spherical Bearing 4 which allows the motion of the lever in direction B. The Thrust Bearing 5 prevents the lever moving in an upwards direction

Figure 6 shows another possible system, using the combined Clutch and Brake Actuator with Hydraulic Bias Valve, suitable for Pedal operation. Depressing Pedal 1, with more pressure towards position 1, operates the Bias Valve and thus operates the brakes.

Note; Adjustors E and D can be set, to ensure for safety reasons, that the brakes are eventually operated regardless of how the pedal is depressed.

**Abstract**

**A system which utilises, a combination of a Hydraulic Spool Valve and a Mechanical Leverage arrangement, to facilitate the combining of both the Clutch and Brake functions of a motorised vehicle, to enable these functions to be operated by a single appendage.**

OWEN HUTCHISON

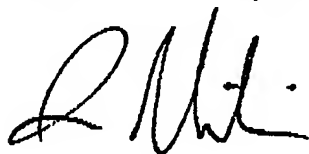
A handwritten signature in black ink, appearing to read 'O. Hutchison', written below the printed name.

FIGURE 1

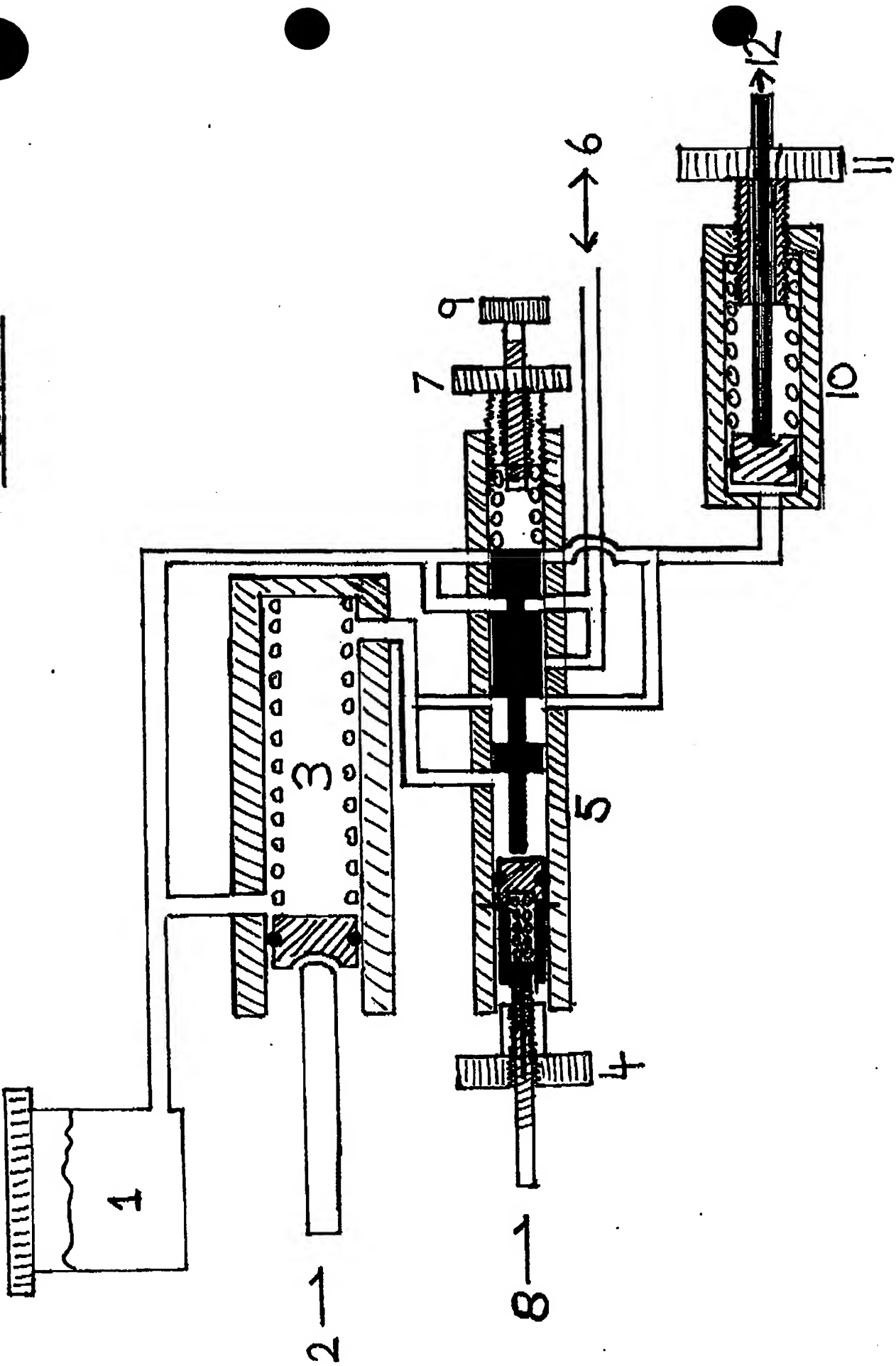
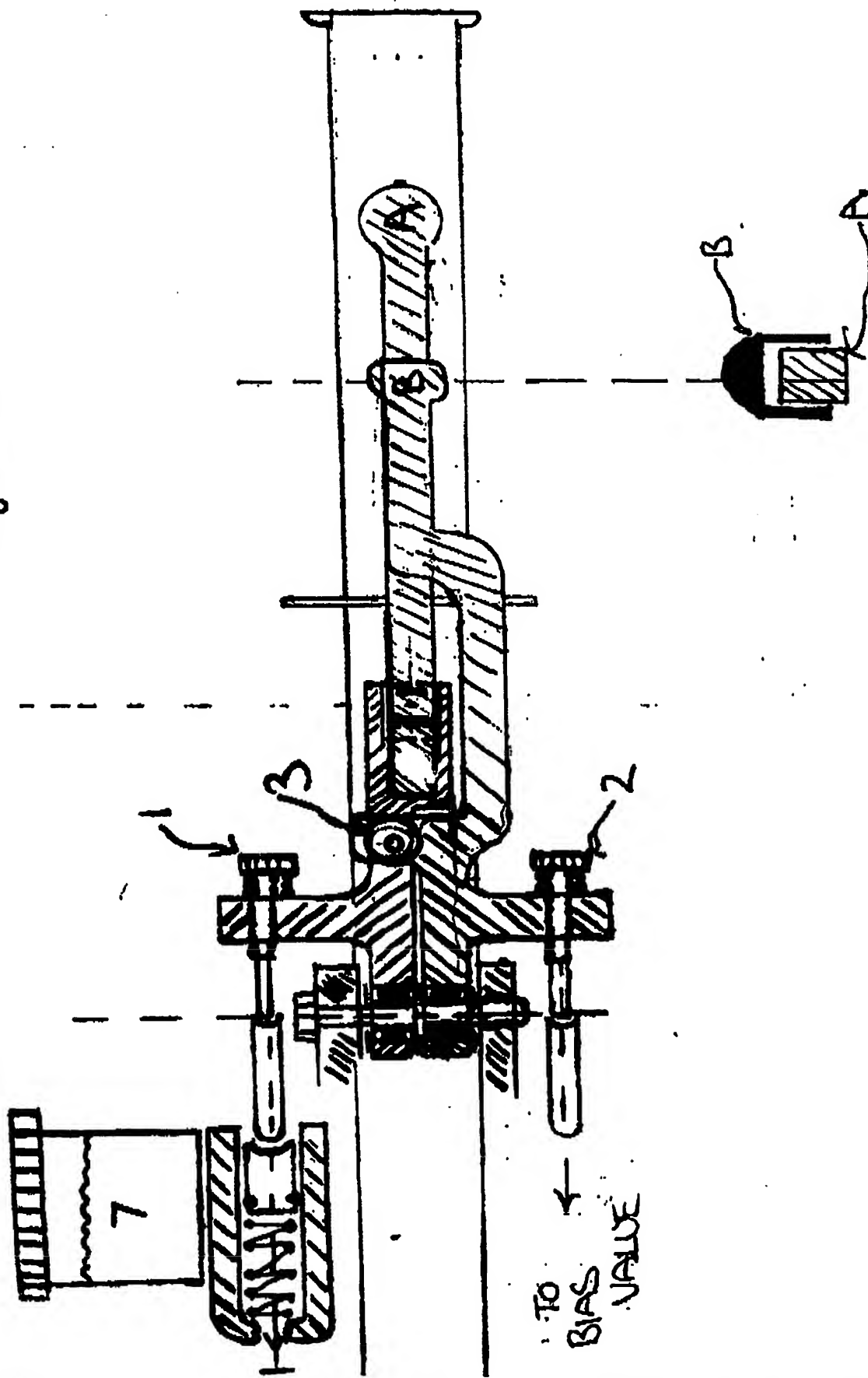


Figure 2



THREE TO TWO





Figure 4

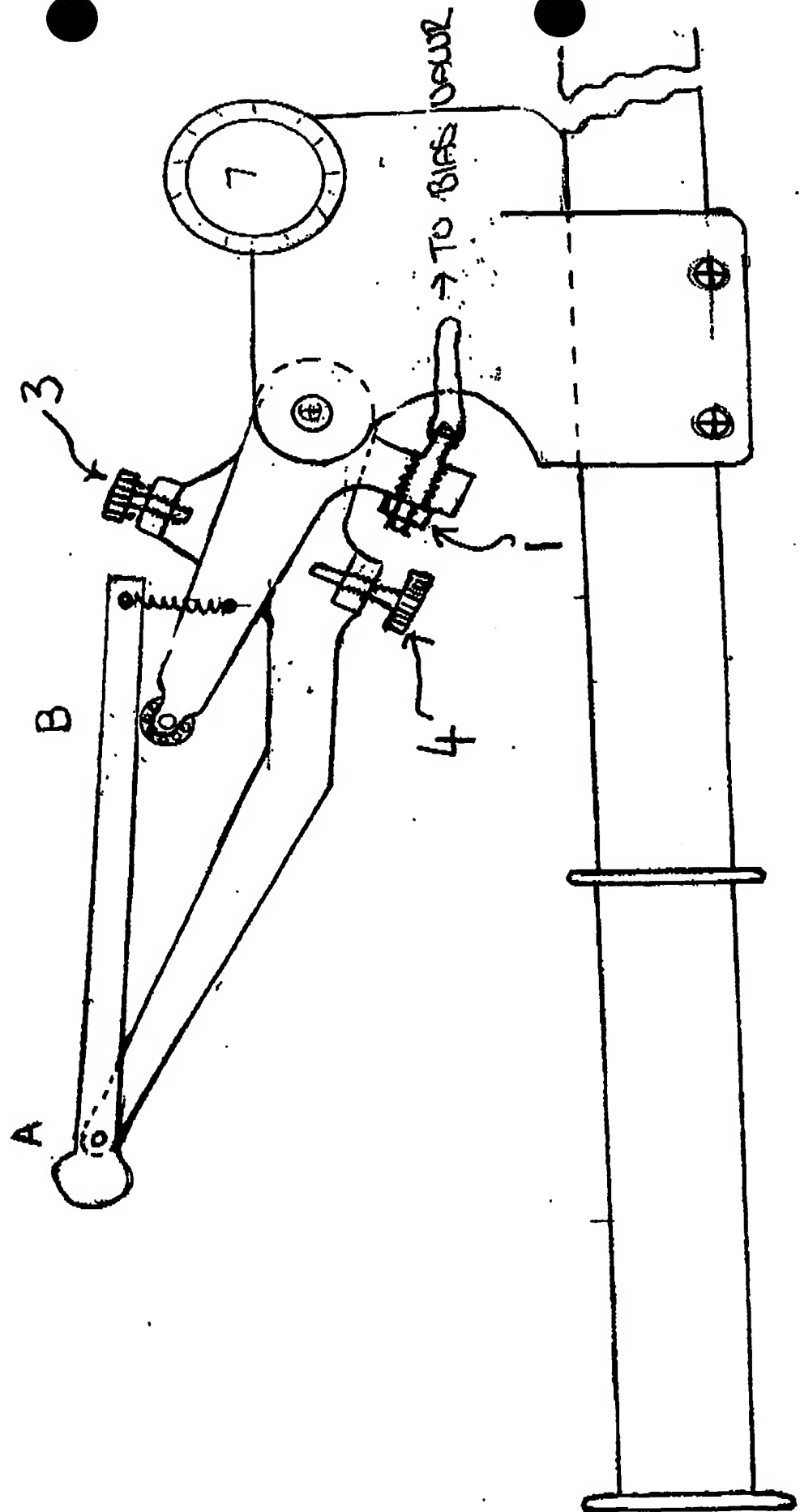


Figure 2

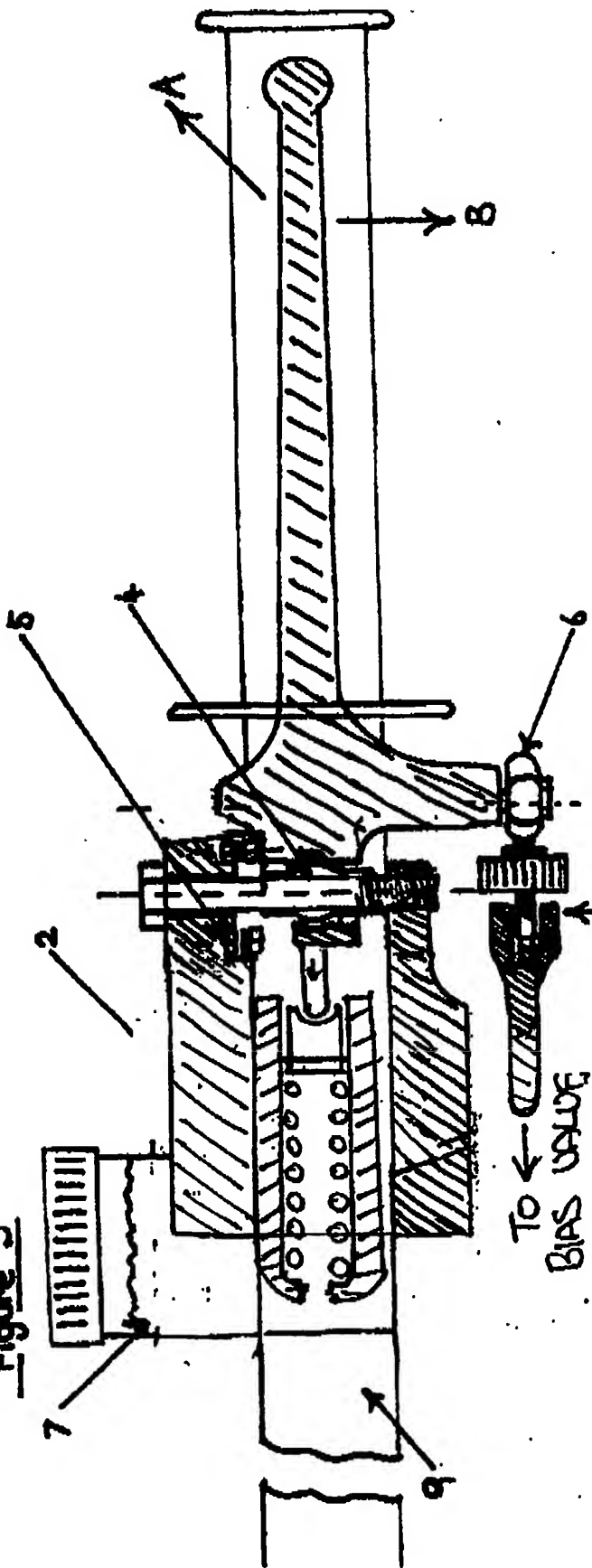


Figure 2

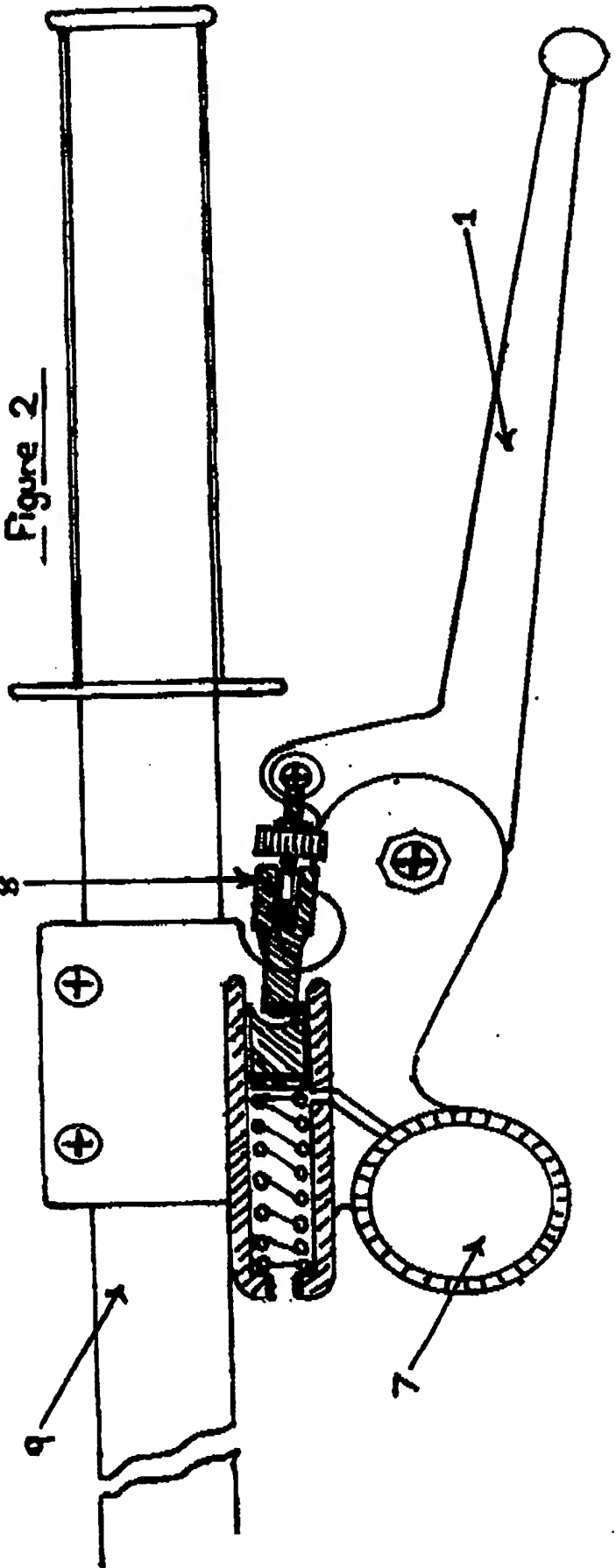
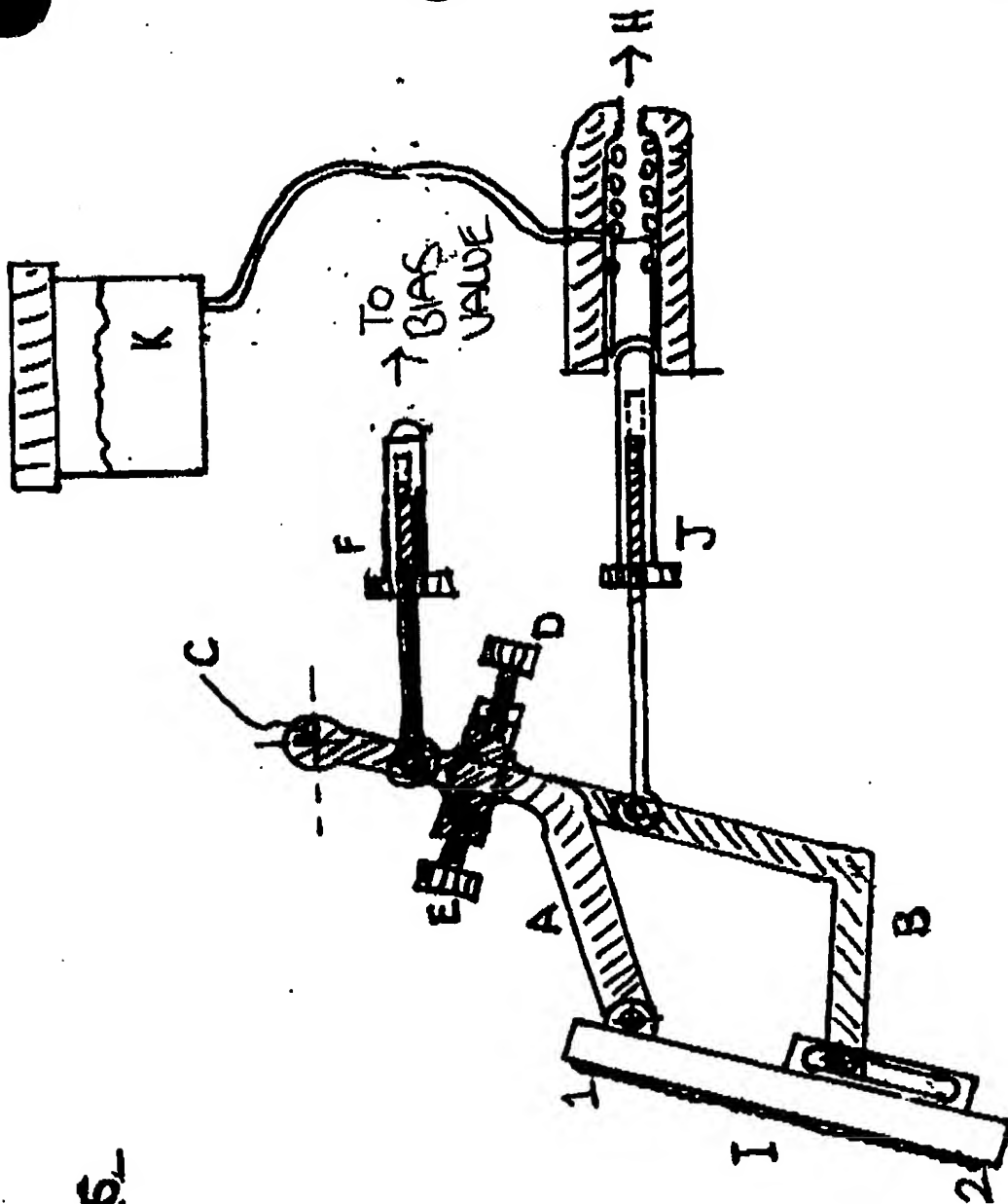


FIGURE 6.



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